Evaluation and Certification of Revised SRD

This revision involves modifications of standards previously identified in the approved SRD, specifically SRD Vol. II, Appendices A and B, which are implementing standards to a number of SRD Safety Criteria. Appendices A and B are being revised to explicitly credit administrative controls (including evacuation) in control strategies that protect facility workers.

Consequently, an evaluation must be performed to demonstrate that the revised SRD will continue to identify a set of standards that will provide adequate safety, comply with all applicable laws and regulations, and conform to top-level safety standards. This determination must be certified.

Evaluation

Evaluation against Applicable SRD Safety Criteria

This revision involves the modification of SRD Appendices A and B, which are identified as implementing standards in the following SRD Safety Criteria:

Safety Criterion	SRD Appendix	Revision Impact Assessment
1.0-2	A	None; principal emphasis is still placed on prevention.
1.0-3	A	None; no impact on risk goals.
1.0-4	A	None; no impact on risk goals.
1.0-5	A	None; no impact on risk goals.
1.0-6	A, B	None; no change in requirement to demonstrate that design and operation measures that protect against accident conditions perform their intended purpose with high confidence.
1.0-7	B	Potential impact; see detailed evaluation below.
1.0-8	A	None; no impact on classification of SSCs.
2.0-1	A	None; no impact on Radiological Dose Standards.
2.0-2	A	None; no impact on chemical dose standards.
3.1-6	A	None; no impact on the process of addressing and communicating hazard analysis team's findings.
3.2-1	A	None; no impact on the need to conduct risk analyses.
4.1-1	B	Potential impact; see detailed evaluation below.
4.1-3	A	None; no impact on design for natural phenomena hazards.
4.1-4	A	None; no impact on design for natural phenomena hazards.
4.2-1	A, B	None; no impact on confinement design.
4.2-2	A	None; no impact on confinement design.
4.3-4	B	None; no impact on instrumentation and controls design.
4.3-5	B	None; no impact on separation of redundant control system channels.
4.3-6	B	None; no impact on the need to design instrumentation and controls to facilitate correct operator actions.
4.3-7	A	None; no impact on control room habitability design.
4.4-1	A	None; no impact on listing of ITS electric and mechanical components.
4.4-4	A	None; no impact on design of service life of ITS SSCs.

As noted above, this revision potentially impacts SRD Safety Criteria 1.0-7 and 4.1-1.

Safety Criterion 1.0-7 states:

> *To compensate for potential human and equipment failures, a defense-in-depth strategy shall be applied to the facility commensurate with the hazards; such that, as appropriate to control the risk, safety is vested in multiple, independent safety provisions, no one of which is to be relied upon excessively to protect the public, the workers, or the environment. This strategy shall be applied to the design and operation of the facility.*

Safety Criterion 4.1-1 states:

> *The facility design shall provide for the prevention and mitigation of risks associated with radiological and chemical material inventories and energy sources. The facility design shall include consideration of normal operation (including startup, testing and maintenance), anticipated operational occurrences, external events, and accident conditions.*
>
> *Prevention shall be the preferred means of achieving safety.*
>
> *Defense-in-depth shall be applied commensurate with the hazard to provide multiple physical and administrative barriers against undue radiation and chemical exposure to the public and workers.*

BNFL Inc. does not intend to rely excessively on administrative controls to protect facility workers; however, there may be cases in which, commensurate with the hazard, the control strategy for facility worker protection may rely on administrative controls (e.g., procedural compliance, adherence to the Radiation Protection Program, appropriate response to area or airborne radiation monitor alarms, etc.). Typically, administrative controls would be relied upon exclusively only for low severity events (e.g., SL-4 – see SRD Vol. II, Appendix A). For higher severity events, administrative controls may be part of the control strategy, in combination with other design safety features.

This revision has no impact on prevention being the preferred means of achieving safety, nor with the need for the facility design to account for the range of operational conditions from normal operations through postulated accidents. Therefore, this revision does not challenge Safety Criteria 1.0-7 and 4.1-1.

Adequate Safety

RPP-WTP facility workers will receive training in recognizing and responding to the hazards of the facility. They will also receive training in recognition of alarms and warnings via the plant public address system, etc. Emergency response will be defined in instructions, and facility workers will be trained in these instructions as part of their basic training. This training is refreshed periodically. Emergency drills and exercises for response to radiometric alarms and fault conditions will take place on a regular basis in the plant.[1] Consequently, although BNFL Inc.'s preferred approach is to provide design safety features that do not require operator action to limit worker exposure in the event of an accident, where such features are not practical, control strategies may credit specific administrative controls, when appropriate, to provide adequate protection and limit facility worker exposure.

[1] See ISMP section 1.3.12, "Training," section 1.3.13, "Procedures," Table 3-5, "Outline and Content of Emergency Response Plan," and section 3.15, "Training and Qualification," plus ISAR section 3.4, "Training and Qualification".

In addition, SRD Vol. II Appendix B, section 3.0, Determination of SSCs for the Implementation of Defense in Depth, is being revised to clarify that administrative controls alone (including evacuation) may be credited in lieu of SSCs in control strategies that protect facility workers. Such credit must be justified; this includes demonstrating that the strategy meets the applicable target frequency for the hazard severity level. Therefore, the SRD standard will continue to provide adequate safety.

In conjunction with this latter change, BNFL Inc. identified an inadvertent statement in SRD Vol. II Appendix B, section 3.0, regarding credit for administrative controls in the evaluation of whether a selected control strategy meets the target frequency established for a particular hazardous situation [p. B-14, under heading "3rd Column – Target Frequency (yr^{-1})"]. Inasmuch as the remainder of SRD Vol. II Appendices A and B are clear that administrative controls may be credited in control strategies (albeit not as the preferred approach), the sentence is reworded as follows:

> "(No credit is taken for administrative controls in calculating the initiating event frequency.") [Changes shown in double-underline.]

BNFL Inc. believes that, read in context, this is the original intent of the sentence.

Compliance with All Applicable Laws and Regulations

The laws and regulations applicable to RPP-WTP (i.e., 10 CFR 830.120 and 10 CFR 835) do not address the use of administrative controls in control strategies that protect workers from accident conditions. Although 10 CFR 835 does address administrative controls that protect workers against radiological hazards from normal operation, this revision is not concerned with such administrative controls.

Conformance to Top-Level Safety Standards

The following paragraphs discuss the impact of this revision on the top-level safety standards of DOE/RL-96-0006.

3.1.1 Operations Risk Goal

The risk, to the population (public and workers) in the area of the Contractor's facility, of cancer fatalities that might result from facility operation should not exceed one-tenth of one percent (0.1%) of the sum of cancer fatality risks to which members of the U.S. population generally are exposed.

Evaluation: BNFL Inc.'s assessment of conformance to the operations risk goal is not affected by this revision, because the reliability of credited administrative controls will be accounted for in the assessment.

3.1.2 Accident Risk Goal

The risk, to an average individual in the vicinity of the Contractor's facility, of prompt fatalities that might result from an accident should not exceed one-tenth of one percent (0.1%) of the sum of cancer fatality risks to which members of the U.S. population generally are exposed.

Evaluation: BNFL Inc.'s assessment of conformance to the accident risk goal is not affected by this revision, because the reliability of credited administrative controls will be accounted for in the assessment.

3.1.3 Worker Accident Risk Goal

The risk, to workers in the vicinity of the Contractor's facility, of prompt fatalities that might result from an accident should not be a significant contributor to the overall occupational risk of fatality to workers.

Evaluation: BNFL Inc.'s assessment of conformance to the worker accident risk goal is not affected by this revision, because the reliability of credited administrative controls will be accounted for in the assessment.

3.3.2 Worker Protection

Measures in the design and operation of the facility to protect the workers against accident conditions should be evaluated using an acceptable approach to demonstrate that they perform their intended purpose with high confidence.

Evaluation: Administrative controls related to operation of the facility may be an acceptable approach for protecting workers against accident conditions. The approach used to demonstrate that such controls will perform their intended purpose with high confidence is described in SRD Vol. II, Appendix A.

4.1.1.1 Defense in Depth

To compensate for potential human and mechanical failures, a defense-in-depth strategy should be applied to the facility commensurate with the hazards such that assured safety is vested in multiple, independent safety provisions, no one of which is to be relied upon excessively to protect the public, the workers, or the environment. This strategy should be applied to the design and operation of the facility.

Evaluation: BNFL Inc. does not intend to rely excessively on administrative controls to protect facility workers; however, there may be cases in which, commensurate with the hazard, the control strategy for facility worker protection may rely on administrative controls (e.g., procedural compliance, adherence to the Radiation Protection Program, appropriate response to area or airborne radiation monitor alarms, etc.). Typically, exclusive reliance on administrative controls would be made only for low severity events (e.g., SL-4 – see SRD Vol. II, Appendix A). For higher severity events, administrative controls may be part of the control strategy, in combination with other design safety features.

As discussed in SRD Vol. II Appendix B, Implementing Standard for Defense in Depth, standards for prevention, control and human aspects are primarily concerned with defense in depth sub-principles that minimize the potential of hazard initiation. In evaluating accidents that are postulated to occur despite implementation of preventive, control and human aspects, the sub-principles of mitigation and automatic systems must be considered. Adherence to the sub-principles of automatic system implies reliance on SSCs in the control strategy, while mitigation typically is achieved by means of passive barriers. This SRD revision credits administrative controls for protection of facility workers in control strategies for accidents that are postulated to occur despite implementation of preventive, control and human aspects. While SSCs may not afford complete protection in such cases, SSCs typically will serve to alert facility workers of a hazardous situation. These SSCs may be alarms, sirens, public address systems, etc. Furthermore, reliance on administrative controls may be made only when justified; this includes demonstrating that the reliability of the credited administrative controls satisfies the applicable target frequency for the hazard severity level, in accordance with SRD Vol. II, Appendix B.

4.1.1.2 Prevention

Principle emphasis should be placed on the primary means of achieving safety, which is the prevention of accidents, particularly any that could cause an unacceptable release.

Evaluation: This revision has no impact on prevention being the preferred means of achieving safety, nor with the need for the facility design to account for the range of operational conditions from normal operations through postulated accidents.

4.1.1.3 Control

Normal operation, including anticipated operational occurrences, maintenance, and testing, should be controlled so that facility and system variables remain within their operating ranges and the frequency of demands placed on structures, systems, and components important to safety is small.

Evaluation: When justified, the use of administrative controls (e.g., procedures) is an acceptable approach for conforming to the defense-in-depth sub-principle of control.

4.1.1.6 Human Aspects

The human aspects of defense in depth should include a design for human factors, a quality assurance program, administrative controls, internal safety reviews, operating limits (Technical Safety Requirements), worker qualification and training, and the establishment of a safety/quality program.

Evaluation: This revision clarifies the credit for administrative controls (one of the human aspects of defense in depth) that may be taken to protect facility workers. With respect to this top-level principle, BNFL Inc.'s *Implementing Standard for Defense in Depth* (SRD Vol. II, Appendix B) states:

> "The primary means of implementing defense in depth is through the provision of multiple physical barriers that maintain confinement…. Administrative controls alone shall not be relied on for the implementation of defense in depth."

The plant design does provide multiple physical barriers that maintain confinement during normal operation; however, certain hazardous situations may challenge that confinement. In view of the facility workers' qualifications and training, when protection against such hazardous situations by means of SSCs is not practical, it is reasonable to rely on administrative controls to provide adequate safety. Consequently, the second sentence of the above quote from SRD Vol. II Appendix B is being revised to state:

> "***For the purpose of protecting the public and co-located workers,*** administrative controls alone shall not be relied on for the implementation of defense in depth***. Administrative controls alone may be credited as the controls that protect facility workers, when appropriate. In such cases, defense in depth is provided through other human aspects, such as worker qualification and training***." [New wording in bold-italics]

4.2.6.1 Human Error

The possibility of human error in facility operations should be taken into account in the design by facilitating correct decisions by operators and inhibiting wrong decisions and by providing means for detecting and correcting or compensating for error.

Evaluation: This revision accounts for the possibility of human error as follows: First, reliance on administrative controls may be made only when justified; this includes demonstrating that the reliability of the credited administrative controls satisfies the

applicable target frequency for the hazard severity level, in accordance with SRD Vol. II, Appendix B. This demonstration must take into account the potential for human error, if human intervention is credited in the control strategy. Furthermore, credit for administrative controls in protecting workers will be taken only to the extent commensurate with the hazard. Typically, exclusive reliance on administrative controls would be made only for low severity events. For higher severity events, administrative controls may be part of the control strategy, in combination with other design safety features. (Severity levels are defined in SRD Vol. II, Appendix A.)

Consequently, this revision conforms to top-level safety standards.

Certification

The SRD continues to identify a recommended set of standards that, when properly implemented, will provide adequate safety, comply with all applicable laws and regulations, and conform to top-level safety standards.

Certification that the revised SRD identifies a set of standards that continues to provide adequate safety, complies with all applicable laws and regulations, and conforms to top-level safety standards is based on adherence to the DOE/RL-96-0004 standards identification process and successful completion of review and confirmation by the PSC.

RPP-WTP General Manager/Designee Date